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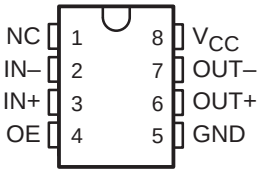
TL712
DIFFERENTIAL COMPARATOR

SLCS002C – JUNE 1983 – REVISED AUGUST 2000

- **Operates From a Single 5-V Supply**
- **0 to 5.5 V Common-Mode Input Voltage Range**
- **Self-Biased Inputs**
- **Complementary 3-State Outputs**
- **Enable Capability**
- **Hysteresis . . . 5 mV Typ**
- **Response Times . . . 25 ns Typ**

D, P, OR PS PACKAGE
(TOP VIEW)



NC – No internal connection

description

The TL712 is a high-speed comparator fabricated with bipolar Schottky process technology. The circuit has differential analog inputs and complementary 3-state TTL-compatible logic outputs with symmetrical switching characteristics. When the output enable (OE) is low, both outputs are in the high-impedance state. This device operates from a single 5-V supply and is useful as a disk memory read-chain data comparator.

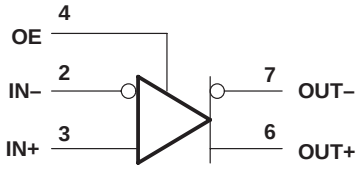
The TL712C is characterized for operation from 0°C to 70°C.

AVAILABLE OPTIONS

T_A	PACKAGED DEVICES		
	PLASTIC SMALL OUTLINE (D)	PLASTIC SMALL-OUTLINE EIAJ (PS)	PLASTIC DIP (P)
0°C to 70°C	TL712CD	TL712CPSR	TL712CP

The PS package is only availiable tape and reeled. The D package also is available taped and reeled. Add the suffix R to device type (e.g., TL712CDR).

symbol (positive logic)



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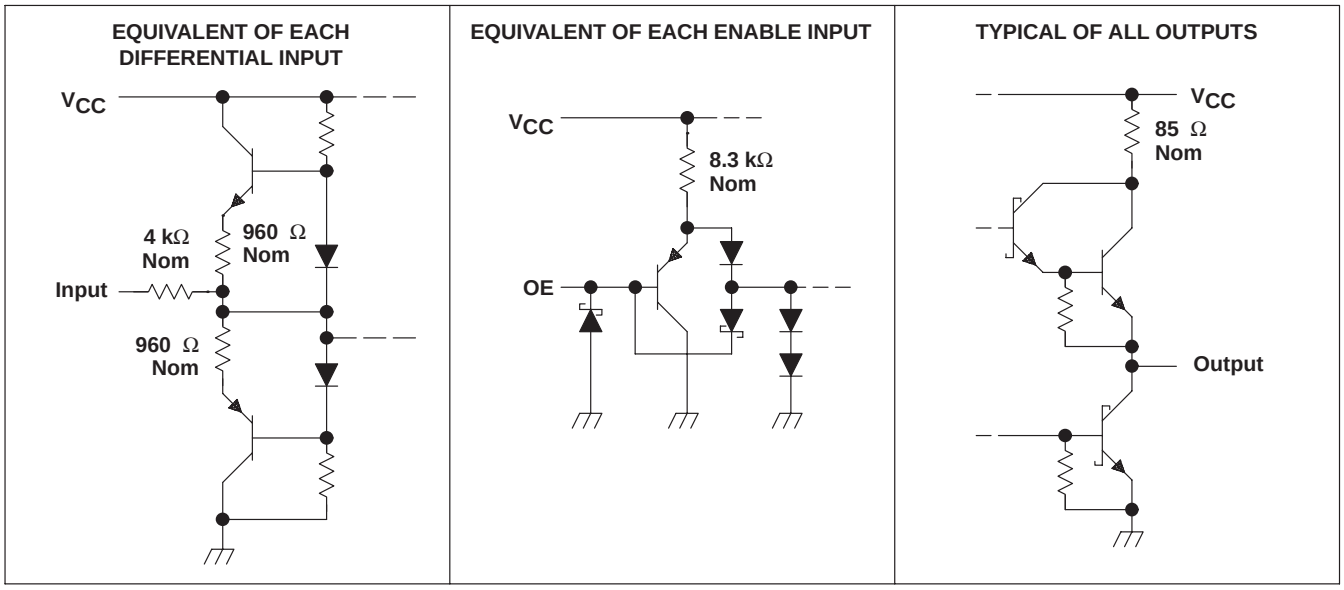
schematics of inputs and outputs



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Differential input voltage, V_{ID} (see Note 2) . . . . . ±25 V
Input voltage, V_I, any differential input . . . . . ±25 V
Output enable voltage . . . . . 7 V
Low-level output current, I_{OL} . . . . . 50 mA
Package thermal impedance, θ_{JA} (see Note 3): D package . . . . . 97°C/W
P package . . . . . 85°C/W
PS package . . . . . 95°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C
Storage temperature range, T_{stg} . . . . . –65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the “recommended operating conditions” section of this specification is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. All voltage values, except differential voltages, are with respect to the network ground.
2. Differential voltage values are at IN+ with respect to IN–.
3. The package thermal impedance is calculated in accordance with JESD 51.

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
Common-mode input voltage, V_{IC}	0		5.5	V
High-level output current, I_{OH}			–1	mA
Low-level output current, I_{OL}			16	mA
Operating free-air temperature, T_A	0		70	°C

electrical characteristics at V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_T	Threshold voltage (V_{T+} and V_{T-})	V_{ICR} = 0 to 5 V		–100†		100	mV
V_{hys}	Hysteresis ($V_{T+} - V_{T-}$)				5		mV
V_{OH}	High-level output voltage	V_{ID} = 100 mV,	I_{OH} = –1 mA	2.7	3.5		V
V_{OL}	Low-level output voltage	V_{ID} = – 100 mV,	I_{OL} = 16 mA		0.4	0.5	V
I_{OZ}	Off-state output current	V_O = 2.4 V				–20	μA
I_I	Enable current	V_I = 5.5 V				100	μA
IIH	High-level enable current	V_{IH} = 2.7 V				20	μA
I_{IL}	Low-level enable current	V_{IL} = 0.4 V				–360	μA
r_i	Differential input resistance			4			kΩ
r_o	Output resistance					100	W
I_{OS}	Short-circuit output current			–15		–85	mA
I_{CC}	Supply current	V_{ID} = 0, No load			17	20	mA

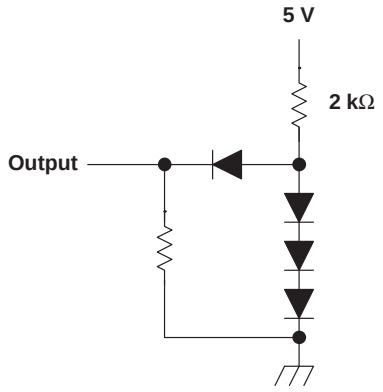
† The algebraic convention, where the more negative limit is designated as minimum, is used in this data sheet for input threshold voltage levels only.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	TTL load, See Figure 1, See Note 4		25		ns
t_{PHL}	Propagation delay time, high-to-low-level output			25		ns

NOTE 4: The response time specified is for a 100-mV input step with 5-mV overdrive (105 mV total), and is the interval between the input step function and the instant when the output crosses 2.5 V.

PARAMETER MEASUREMENT INFORMATION



NOTE A: All diodes are 1N4148 or equivalent.

Figure 1. TTL Output Load Circuit

TYPICAL CHARACTERISTICS

OUTPUT RESPONSE FOR VARIOUS INPUT OVERDRIVE VOLTAGES

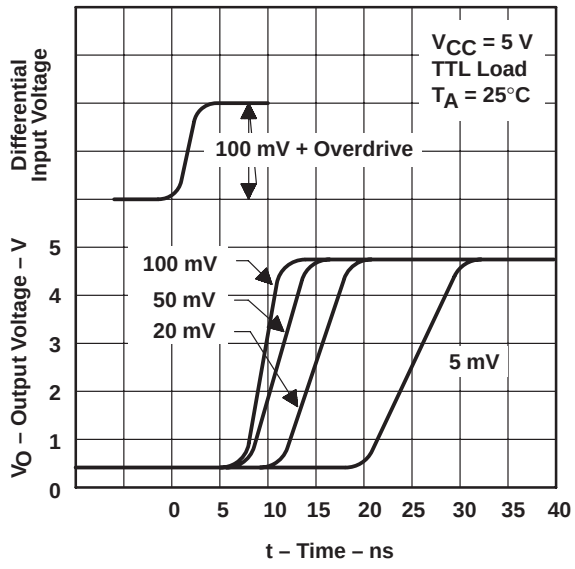


Figure 2

OUTPUT RESPONSE FOR VARIOUS INPUT OVERDRIVE VOLTAGES

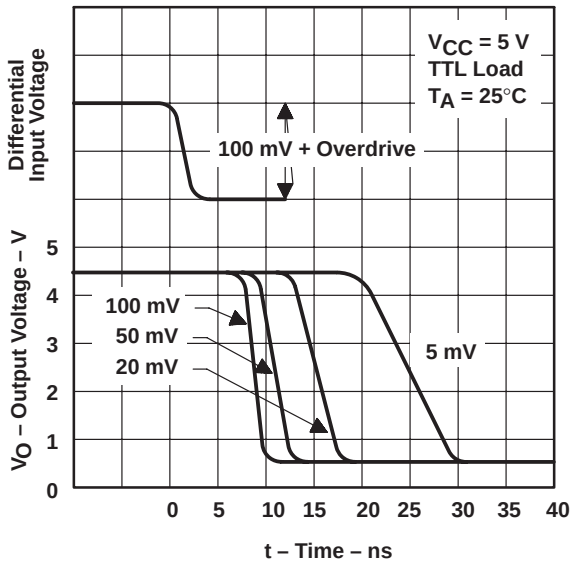


Figure 3

TYPICAL CHARACTERISTICS

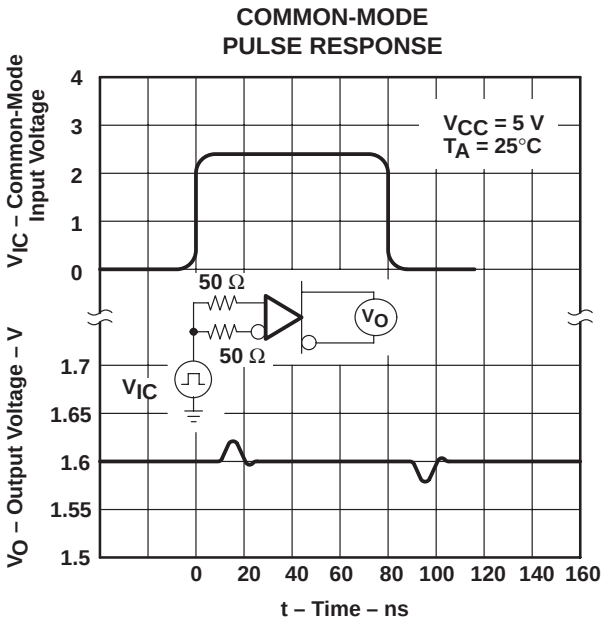


Figure 4

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